A Comparison Between Integrated and Separated - Environmental Education Subject at Elementary School

Rizki Ananda*, Nur Choerun Nisa, Agung Purwanto
Environmental Education Graduate Program, Jakarta State University, Jl. Rawamangun Muka Jakarta Timur, 13220Jakarta, Indonesia
*Corresponding: rizkianandari22@gmail.com

Abstract
"Schools play an important role in the formation of positive attitudes towards the environment in students. Environmentally-based schools are selected by the Indonesian government a designated as Adiwiyata schools. Environmental education in Indonesia can be taught either integrally or separately from other subjects. In this paper, we analyse some possible reasons that influence the environmental knowledge, perceptions, and behavior of students in elementary schools. The differences in learning approaches of environmental education (integrated and separated – subject) was considered. This comparative study was conducted in April 2017. The sample in this study were students in grades 4-6 from two independent Adiwiyata schools in Jakarta. We explored the extent to which learning approaches used in environmental education had an effect on the formation of environmental knowledge, perceptions, and behavior in students. The similarities and differences among these two schools were highlighted. Results showed that students in schools which applied the integrated approach seem to have higher environmental knowledge than schools that applied the separated approach. Students in schools which applied the integrated approach seem to have almost the same perceptions with schools that applied the separated subject approach, and students in schools which applied integrated approach seem to have better pro-environmental behaviors than schools that applied the separated approach. Teachers play an important role in building environmental knowledge, perception, and behavior of students. More efforts are needed to support environmental education with integrated approach in elementary schools."

Keywords: Environmental education, integrated subject, separated subject, adiwiyata school

Introduction
The environmental case is an issue that is so close to human life. One thing that it can not be avoided is the dependence of people with nature and the environment. A nature provides a place for people to make a life. Therefore, we often find that the environment can be damaged by human activity. Environmental sustainability also depends on human behavior. Behavior is everything in the form of actions we do, both verbal and non verbal and can be directly seen or observed (Santrock, 2009). Based on theory of behavior change that to establish behavior we can start from good knowledge (Fishbein & Manfredo, 1992). Environmental knowledge reflects the degree of concern regarding issues in physical environments (Amyx, De Jong, Lin, Chakraborty, & Wiener, 1994). Huang and Shih (2009) suggested that environmental knowledge is related to an understanding and concern regarding natural environments,
and encourages an individual’s stronger responsibility for environmental protection. Good environmental knowledge will build a good environmental perception and good environmental perception will establish good behavior.

Environmental education is a lifelong process with the objective of imparting to its target groups in the formal and nonformal education sectors environmental awareness, ecological knowledge, attitudes, values, commitments for actions, and ethical responsibilities for the rational use of resources and for sound and sustainable development. In Indonesia, the development of environmental education began in 1977. Nowadays, environmental education in Indonesia has been formally applied at various levels of school with the implementation of which can be selected by schools either integrally or separately from other subjects. Environmentally-based schools are selected by the Indonesian government and designated as Adiwiyata schools. Adiwiyata is an Indonesian government program from the Ministry of the Environment and Ministry of Education that aims to create schools with students who have good environmental behavior.

The elementary school is a formal education institution to build and form children’s character in accordance with the development of their age. It is expected that elementary schools can be serious and committed in building students’s good characters. There are two elementary schools are predicated as independent adiwiyata school in Jakarta. They have different approach in learning environmental education. First, Environmental education subject is taught separately with other subjects, and the other is taught integrally with other subjects. Therefore, this study aims to compare integrated and separated - environmental education subject at elementary school by looking at knowledge, perception, and environmental behavior.

Objectives
This study is conducted to compare and analyses environmental knowledge, perceptions, and behavior of students in elementary school based on in the learning approaches of environmental education (integrated and separated-environmental education subject).

Research Question
The question of this research is how is the comparison between integrated and separated - environmental education subject at elementary school that are predicated as adiwiyata mandiri school based on knowledge, perception, and environmental behavior?

Theory
The Concepts of Environmental Education
We often find that the environment can be damaged by human activity. Halpenny (2010) indicated that environmental degradation is often considered to be human-driven. Therefore, environmental sustainability also depends on human behavior. Based on theory of behavior change that to establish behavior we can start from good knowledge (Fishbein & Manfredo, 1992) (Figure 1). Hungerford, H.E., Volk, T.L (1990) said that, there are three main variable categories that contribute to the formation of citizen behavior are environmental knowledge, environmental sensitivity, and locus of control. In the REB model according to Hynes (1987) that environmental knowledge is an important factor in the establishment of Responsible Environmental Behavior (REB) (Figure 2). Therefore knowledge is very important as
a motivator in formulating the attitude and behavior of the community in order to move with the environment.

Figure 1. Behavior Change Model (Fishbein & Manfredo, 1992)

Environmental education demonstrated that when individuals have more environmental knowledge, their environmental concern will be stronger (Hines, Hungerford, & Tomera, 1987; Lyons & Breakwell, 1994). Huang and Shih (2009) suggested that people with higher level environmental knowledge will fulfill the responsibility of environmental protection. Sivek and Hungerford (1989/1990) pointed out that environmental knowledge can enhance people’s environmental sensitivity, and environmental knowledge and environmental sensitivity influence the performance of environmental behavior.

Figure 2. Responsible Environmental Behavior (REB) Model (Hynes, 1987)

The UNESCO-UNEP Congress on Environmental Education and Training (1987) agreed Environmental education should simultaneously attempt to create awareness, transmit information, teach knowledge, develop habits and skills, promote values, provide criteria and present guidelines for problem-solving and decision-making. Environmental education is a process which helps to develop the skills and attitudes needed to understand the relationships between human beings, their-cultures. All programmes of environmental education will therefore include the acquisition of knowledge and understanding and the development of skills. However they should also encourage curiosity, foster awareness and lead to an informed concern which will eventually be expressed in terms of positive action. Furthermore, the process should be implemented through an interdisciplinary approach. Whilst this interdisciplinary approach links closely with many aspects of geography and natural science, it should lead on to participation in practical environmental education activities orientated towards a solution of the problems facing the global environment.
**Adiwiyata School**

*Adiwiyata* program had been initiated by Indonesian government since 2006. *Adiwiyata* is a program of the Ministry of Environment in order to encourage the creation of knowledge and awareness of the school community in the environmental protection. This program is expected that the schools’ communities getting healthy environment and avoiding the negative environmental impacts. *Adiwiyata* has a meaning or significance as a good and ideal place which can be obtained by all the sciences and several of norms and ethics that can be the basis for the creation of the welfare of human life and the ideals of sustainable developments. *Adiwiyata* program goal is to realize the school communities who are responsible for the protection and management of the environment through a good school governance to support the sustainable development (http://www.menh.go.id).

Environmental education can be taught in an integrated or separately with other subjects. Currently in Indonesia, environmental education subject is encouraged to be taught integrally with other subjects, but some schools still choose to teach environmental education separately with other subjects.

**Methodology**

This study was conducted in April 2017, in two elementary schools in Jakarta, SDN 11 Cibubur, East Jakarta and SDS Tarakanita 3 South Jakarta. Samples of 63 students from grades 4-6 were selected. This grade was selected because at this stage the students mind undergoes an developmental change intellectually and socially (Piaget, 1969). Students fill in a questionnaire of knowledge, perception, and behaviors of environment. We accompany the students while they answer questionnaire, it is to make sure that they really answer the questionnaire clearly and with full understanding without guessing the question. We would like to see the difference in the application of separated and integrated environmental education subjects at that schools. Observation and interviews were also conducted as additional data. Interviews are exploring information about how the application of environmental education in the school. The answers from students will analysed statistically using paired t-test to see the difference between samples.

Factors involved in environmental education in the form of environmental issues such as (i) environmental awareness, (ii) population stabilization and the health care, (iii) waste management, (iv) greening the uncultivated land, (v) the water pollution control, (vi) pollution (vii) energy, (viii) global warming (Vizayakumar 2005). Based on these current environmental topics and issues, then that is the basis for making the question items about the knowledge, attitude, and environmental behaviors like the pictures below.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Indicators of Environmental Knowledge</th>
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<tbody>
<tr>
<td>No</td>
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</tr>
<tr>
<td>1</td>
<td>Environmental Awareness</td>
</tr>
<tr>
<td>2</td>
<td>Pollution</td>
</tr>
<tr>
<td>3</td>
<td>Deforestation</td>
</tr>
<tr>
<td>4</td>
<td>Waste management</td>
</tr>
<tr>
<td>5</td>
<td>Global Warming</td>
</tr>
</tbody>
</table>

| Total | 15 |
Table 2

<table>
<thead>
<tr>
<th>No</th>
<th>Indicator</th>
<th>Item Number</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Environmental Damage</td>
<td>1, 2, 3, 4, 5</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Energy Use</td>
<td>6, 7, 8</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Global Warming</td>
<td>9, 10, 11, 12</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Waste Management</td>
<td>14, 15</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td><strong>15</strong></td>
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Table 3

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<th>Item Number</th>
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</thead>
<tbody>
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<td>Wise in Waste Management</td>
<td>1, 2, 3</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Wise in Use Energy</td>
<td>4, 5</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Keep the Environment Clean</td>
<td>6, 7, 8</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Use Environmentally Friendly Product</td>
<td>9, 10, 11, 12</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Support Environmental Policy</td>
<td>13, 14, 15</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

Literature Review

Landriany (2014), her results showed that the policy of living environment in the school already stated in the official decision and integrated in each subject. Then, the schools socialize some of the main activities using the approach to the students to obtain perfect support to create absolute agreement that the school is truly environmental school. Furthermore, researcher still found various situations inhibiting the implementation of Adiwiyata, such as the unit of task is not on time, and there is a group of students who have not been realized in understanding the concept of environmental schools, funding issues, and the support of the society and other parties are still low.

Thathong, his research findings showed that 1) environmental issues were not directly addressed in school-based curriculum but were indicated in some subjects; 2) most of environmental projects and activities were environmental projects and were initiated by the teachers; 3) a lack of environmental knowledge, awareness, and collaboration were major problems in providing projects for the environment apart from lacking of money allocation and necessary equipments.

Findings

Based on results of tests and questionnaires, the comparison of these two schools are in the following pictures.
Figure 4. Environmental Knowledge of SDN Cibubur 11 and SDS Tarakanita

Figure 5. Environmental Perception of SDN Cibubur 11 and SDS Tarakanita

Figure 6. Environmental Behavior of SDN Cibubur 11 and SDS Tarakanita
Figure 7. The Comparison of Environmental Knowledge in Each Indicators

Figure 8. The Comparison of Environmental Perception in Each Indicators
Figure 9. The Comparison of Environmental Behavior in Each Indicators

<table>
<thead>
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<th>No</th>
<th>Parameter</th>
<th>P-Value</th>
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<tbody>
<tr>
<td>1</td>
<td>Knowledge</td>
<td>0.003*</td>
</tr>
<tr>
<td>2</td>
<td>Perceptions</td>
<td>0.075</td>
</tr>
<tr>
<td>3</td>
<td>Behavior</td>
<td>0.001*</td>
</tr>
</tbody>
</table>

* P ≤ 0.05 is significantly different

Figure 10. The Comparison of Environmental Knowledge, Perception and Behavior between SDN 11 Cibubur and SDS Tarakanita 3

Discussion

SDN Cibubur 11 and SDS Tarakanita are elementary school in Jakarta that predicated as adiwiyata school. Independent Adiwiyata School is the second highest level of school before reaching the title as Adiwiyata Nasional School. There are 4 aspects that are considered in determining independent adiwiyata school are (1) Policy, (2) Curriculum, (3) Activity (4) Facilities. From the result of the research covering the three aspects of the students in the form of environmental knowledge, environmental perception, and environmental behavior, there are some differences between SDN Cibubur 11 (applied integrated environment education with other subjects) and SDS Tarakanita 3 (applied separated environment education with other subjects).

The Comparison of Environmental Knowledge

Based on the results of research from 63 students in each school, SDS Tarakanita 3 got a total score of 743 with an average of 11.79. SDN Cibubur 11 obtained a total score of 646 with an average of 10.25. Environmental knowledge between SDN 11 Cibubur and SDS Tarakanita 3 students are significantly different based on their answer for the questionnaire items (P-Value 0.003). SD Tarakanita 3 applying environmental education subjects separately with other subjects managed to
obtain the student's environmental knowledge value is higher than the SDN Cibubur 11 which apply environmental education subjects integrated with other subjects.

When viewed from each indicator, Score of SDS Tarakanita 3 are 122 (environmental awareness), 99 (pollution), 159 (forest), 89 (waste management), 274 (global warming) and Score of SDN Cibubur 11 are 111 (environmental awareness), 83 (pollution), 144 (forest), 83 (waste management), 225 (global warming). SDN Tarakanita 3 is better in all indicators. It indicates that students obtain complete and deep environmental knowledge because environmental education taught in separately with other subjects. According Maryono (2015) that learning is taught independently and separately from other subjects will further enhance the student's knowledge. Students will focus on one particular topic in these subjects, but the drawback is that students only master theoretical and lack of control in practice.

The Comparison of Environmental Perception

Based on the results of research from 63 students in each school, SDS Tarakanita 3 got a total score of 825 with an average of 13.09. SDN Cibubur 11 got a total score of 823 with an average of 13.06. Paired t-test value also shows the environmental perception between SDN 11 Cibubur and SDS Tarakanita 3 are not significantly different (P-value 0.075). When viewed from each indicator, Score of SDS Tarakanita 3 are 246 (environmental damage), 183 (energy use), 195 (global warming), 174 (waste management) and score of SDN Cibubur 11 are 246 (environmental damage), 182 (energy use), 210 (global warming), 187 (waste management). SDN Tarakanita 3 is better on indicator 4 (Global warming) and 5 (Waste management). Different environmental education lessons taught separately with other subjects there is a special topic on global warming and clear waste management so that students can understand and have a better environmental perception.

The Comparison of Environmental Behavior

Based on the results of research from 63 students in each school it is seen that the level of environmental behavior SDS Tarakanita 3 got an average of 4.47 and SDN Cibubur 11 obtained an average of 4.05. There are significant differences between the two schools. SDN Cibubur 11 that implement an environmental education integrally with other subjects got higher score than SD Tarakanita 3 that implement environmental education subjects separately with other subjects.

When viewed from each indicator, scores of SDS Tarakanita are 3 4.37 (wise in waste management), 4.70 (wise in energy use), 3.91 (keep the environment clean), 3.77 (use environmentally friendly product), 3.87 (support environmental policy) and score of SDN Cibubur 11 are 4.69 (wise in waste management), 4.67 (wise in energy use), 4.40 (keep the environment clean), 4.29 (use environmentally friendly product), 4.47 (support environmental policy). SDN Cibubur 11 is better in all indicators. Statistically, environmental behavior between SDN 11 Cibubur and SDS Tarakanita 3 students are significantly different (P-Value 0.001). This shows that students gain the knowledge environment by using integrated approach has better environmental behavior.

Collin, et.al, (1991) said to be meaningful because in integrated learning, students will understand the concepts learned through direct experience and relate them to other concepts that the child understands through the opportunity to learn what is related to the theme or authentic event (natural). In such learning, children are expected to always get the opportunity to be actively involved accordance with the aspirations and interests, which in integrated learning really appreciate diversity.
Limitation
We recommend that similar research can be done at other school level such as high school and university in order to know the application of environmental education suitable for other education level.

Recommendation
Based on the results of research and discussion, it is recommended that the environment education at elementary school is taught integrally with other subjects. It aims to form a good student environment behavior in everyday by applying it in various fields. Teachers further play an important role in environmental information, perceptions, and behaviors of students. More competence of subject teachers must be balanced with knowledge and skills in the field of environmental education so as to integrate other subjects with the field of environmental education.

Conclusion
The conclusions in this research are students in schools which applied environmental education subject in integrated approach seem to have higher environmental knowledge than schools that applied it the separated approach. Students in schools which applied environmental education subject in integrated approach seem to have almost the same perceptions with schools that applied it the separated subject approach, and students in schools which applied integrated approach seem to have better pro-environmental behaviors than schools that applied it in the separated approach.

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References


